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| <p>(57) Abstract</p> <p>The present invention is directed to a mechanical fastener device. The mechanical fastener device comprises a base having a first surface and a second surface opposing the first surface. The first and second surfaces have a first region and a second region. The mechanical fastener comprises a plurality of engaging elements extending from the first surface of the base in the first and second regions. The engaging elements are mechanically engageable with a loop fastening material or other fibrous material. The base is folded such that the first region and the second region face one another. The engaging elements in the first region mechanically engage with the engaging elements in the second region to maintain the mechanical fastener in a folded state until manually unfolded to expose the engaging elements in the first and second regions. The second surface of the first region is joined to an article. The present invention is also directed to a disposable article having the mechanical fastener device. The present invention is also directed to a method for making the mechanical fastener device.</p> |   |  |  |  |

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## MECHANICAL FASTENER DEVICE

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FIELD

The present invention relates to mechanical fasteners, such as hook and loop type, and the like. More specifically, the present invention relates to a means for protecting the hook portion of a mechanical fastener when the mechanical fastener is not in use.

BACKGROUND

Mechanical fasteners, such as hook and loop type mechanical fasteners, are well known. Typically, the loop (or "female") portion of the mechanical fastener has a fabric-like backing having a multiplicity of upstanding loops projecting from its surface. The hook (or "male") portion typically has a base material having hooks or male fastening elements having upstanding stems with individual hook fiber engaging elements projecting from a top portion of the stems. These engaging elements are capable of engaging individual or multiple fibers of the loop fastening material. The hook portion may take on a variety of shapes, including, e.g., J-hook, T-hook, or mushroom shape.

Examples of various known mechanical fasteners can be found in, e.g., U.S. Patent 4,322,875 issued to Brown et al. on April 6, 1982, and U.S. Patent 4,701,179 issued to Kellenberger et al. on October 20, 1987, which disclose mechanical fastening systems having identical complementary elements; and U.S. Patent 5,699,593 issued to Jackson on December 23, 1997, and U.S. Patent 5,537,722 which disclose mechanical fastening systems having distinct complementary elements.

Mechanical fasteners have been used in a variety of disposable articles, including sweat bands, bandages, body wraps, and disposable garments including disposable diapers, and disposable absorbent pads including sanitary napkins and incontinence devices. For example mechanical fastener devices have been employed as a waist fastening system in disposable diapers. In this example, the fastener device is used for fastening between the front and back ear panels (or side panels) of disposable diapers. Such fastener devices are disclosed, for

example, in U.S. Patent No. 4,963,140 issued to Robertson et al. on October 16, 1990 and U.S. Patent No. 5,019,065 issued to Scripps on May 28, 1991. Another example of application of mechanical fastener devices is a fastening system which is used as a disposal securing means for disposable diapers after the diaper has been soiled. In this example, the mechanical fastener device or disposal device is provided on the outer surface of a backsheet and is used for securing soiled disposable pull-on garments in a convenient disposal configuration. The convenient disposal configuration is preferably achieved by mechanically securing a part of the backsheet to the other part of the garments, for example, ear panels (or side panels) through the mechanical fastener device or disposal device. Examples of such fastener devices are disclosed, for example, in Japanese Laid-open Patent Publication No. H10-99371 (Joho) published on April 21, 1998. Yet another example of application of mechanical fastener devices is a mechanical fastening system which is used for securing disposable absorbent pads to wearers' undergarments. In this example, the mechanical fastener device is provided on the outer surface of a backsheet and is used for mechanically securing the absorbent pad to the crotch portion of the wearer's undergarment. Examples of such mechanical fastener devices are disclosed, for example, in U.S. Patent No. 5,300,058 issued to Goulait et al. on April 5, 1994.

Typically, the hook portion needs to be protected when not in use, as the exposed hook portion may irritate the user's skin; attach itself to an undesired/unintended location; and/or collect stray fabric material within its individual elements, thereby limiting its ability to securely join the loop portion during intended use. However, and particularly when such a mechanical fastener is employed in a disposable article, there is a need to provide such protection of the hook portion at minimal additional cost.

Based on the foregoing, there is a need for a mechanical fastener wherein the hook portion remains protected when not in use, yet adds little cost to the mechanical fastener.

The present invention is directed to a mechanical fastener device. The mechanical fastener device comprises a base having a first surface and a second surface opposing the first surface. The first and second surfaces have a first region and a second region. The mechanical fastener comprises a plurality of engaging elements extending from the first surface of the base in the first and

second regions. The engaging elements are mechanically engageable with a loop fastening material or other fibrous material. The base is folded such that the first region and the second region face one another. The engaging elements in the first region mechanically engage with the engaging elements in the second region to maintain the mechanical fastener in a folded state until manually unfolded to expose the engaging elements in the first and second regions. The second surface of the first region is joined to an article.

5 The present invention is also directed to a disposable article having the mechanical fastener device.

10 The present invention is also directed to a method for making the mechanical fastener device.

The foregoing answers the need for a mechanical fastener wherein the engaging elements (i.e., hook portion) remains protected when not in use, yet adds little cost to the mechanical fastener.

15 These and other features, aspects, and advantages of the present invention will become evident to those skilled in the art from reading of the present disclosure.

#### BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and 20 distinctly claiming the invention, it is believed that the invention will be better understood from the following description of preferred embodiments which is taken in conjunction with the accompanying drawings and which like designations are used to designate substantially identical elements, and in which:

Fig. 1 is a cross-sectional view of one embodiment of the mechanical 25 fastener device of the present invention;

Fig. 2 is a cross-sectional view of a preferred embodiment of the mechanical fastener device of the present invention;

Fig. 3 is a cross-sectional view of the unfolded structure of the mechanical fastener device shown in Fig. 2;

30 Fig. 4 is a cross-sectional view of another preferred embodiment of the mechanical fastener device;

Fig. 5 is a cross-sectional view of yet another preferred embodiment of the mechanical fastener device;

35 Fig. 6 is a simplified plan view of a manufacturing process for the mechanical fastener device of one embodiment of the present invention;

Fig. 7 is a cross-sectional view of the first continuous member 750 taken along the line 7-7 of Fig. 6;

Fig. 8 is a cross-sectional view of the second continuous member 760 taken along the line 8-8 of Fig. 6;

5 Fig. 9 is a cross-sectional view of the first and second continuous members 750 and 760 taken along the line 9-9 of Fig. 6; and

Fig. 10 is a cross-sectional view of the first and second continuous members 750 and 760 taken along the line 10-10 of Fig. 6.

#### DETAILED DESCRIPTION

10 All cited references are incorporated herein by reference in their entireties. Citation of any reference is not an admission regarding any determination as to its availability as prior art to the claimed invention.

Herein, "comprise" means that other element(s) and step(s) which do not affect the end result can be added. These terms encompass the terms "consisting of" and "consisting essentially of".

15 Herein, "disposable garment" describes garments which are not intended to be laundered or otherwise restored or reused as a garment (i.e., they are intended to be discarded after a single use and, preferably, to be recycled, composted or otherwise disposed of in an environmentally compatible manner).

20 Herein, "joined" or "joining" encompasses configurations whereby an element is directly secured to another by affixing the element directly to the other element, and configurations whereby the element is indirectly secured to the other element by affixing the element to intermediate member(s) which in turn are affixed to the other element.

25 Herein, "engaging elements" refer to the elements of a hook fastening material which are intended to mechanically engage the fibrous elements of a complementary surface, such as loop fastening materials. The engaging elements may also be referred to as "male" elements.

30 Herein, "hook" should be non-limiting in the sense that the engaging elements may comprise any shapes as are known in the art so long as they are adapted to engage a complementary surface, such as a loop fastening material or other fibrous material. Examples of useful shapes include, but are not limited to, T-hooks, J-hooks, mushroom, and the like.

35 Herein, "loop fastening material" means a material having a plurality of fiber elements that are capable of engaging the engaging elements. Such materials are

well known to one skilled in the art and include fibrous material, woven and nonwoven. Suitable loop fastening material may be manufactured from a wide range of materials to provide fiber elements, preferably loops. Such suitable materials include nylon, polyester, polypropylene, or any combination of these 5 materials. Suitable examples include, e.g., the commercially available material designated "Scotchmate" brand nylon woven loop No. SJ3401 available from Minnesota Mining and Manufacturing Company, St. Paul, Minnesota, U.S.A.

#### A. Structure of Mechanical Fastener Device

Fig. 1 is a cross-sectional view of an embodiment of the mechanical fastener device of the present invention. In this embodiment, the mechanical fastener device 725 includes a base 730 having a first surface 728 and a second surface 729 opposing the first surface 728. The first surface 728 has a first region 701 which appears below the reference line 777 and a second region 702 which appears above the reference line 777. A plurality of engaging elements 733 extend from the first surface 728 of the base 730 in the first region 701 and the second region 702, to form a securing means 731. The engaging elements 733 are mechanically engageable with a loop fastening material (not shown). The base 730 is folded such that the first region 701 and the second region 702 face one another, and the engaging elements 733 in the first region 701 mechanically engage with the engaging elements 733 in the second region 702 to maintain the mechanical fastener device 725 in a folded state until manually unfolded to expose the engaging elements 733 in the first region 701 and the second region 702. The second surface 729 of the first region 701 is joined to a garment 100. Such a garment 100 may be of the disposable or non-disposable variety which require the 10 use of a mechanical fastener. The mechanical fastener device 725 may be joined to a garment via any number of methods known to one skilled in the art, including, e.g., adhesives and heat bonding. In the embodiment shown in Fig. 1, the 15 mechanical fastener device 725 is secured to the garment 100 by an adhesive 734 provided on the second surface 729 of the base 730.

Preferably, the mechanical fastener device 725 further has a third region 20 703 which extends from the second region 702 to form a tab portion 710. In this embodiment, the tab portion 710 contains no engaging elements. The tab portion 710 does not overlay the first region 701 when the base 730 is in the folded state as shown. In this embodiment, the engaging elements 733 have a T-hook shape, 25 although a variety of other hook shapes are envisioned by the present invention.

The tab portion 710 facilitates disengagement by the user of the engaging elements 733 between the first region 701 and the second region 702, when the user wishes to expose the engaging elements 733 for subsequent engagement with, e.g., a loop fastening material.

5 Prior to such disengagement, this folded state prevents the engaging elements 733 from producing a variety of undesirable results. For example, in this folded state, the engaging elements 733 are prevented from scraping against exposed skin and thereby causing skin irritation. Additionally, this folded state prevents the engaging elements 733 from engaging an undesirable/unintended  
10 material and/or an undesirable/unintended location. Furthermore, this folded state prevents the engaging elements 733 from collecting, e.g., stray fabric, thread or lint, which would reduce the engagement strength of the engaging elements 733 when subsequently intentionally used.

Fig. 2 is a cross-sectional view of a preferred embodiment of a mechanical  
15 fastener device 720 of the present invention. Referring to Fig. 2, the mechanical fastener device 720 includes a base 730 which has a first surface 728 and a second surface 729 opposing the first surface 728; a securing means 731 which includes a plurality of engaging elements 733 extending from the first surface 728 of the base 730; an adhesive 734 provided on the second surface 729 of the base  
20 730 and an outer member 736 provided on a part of the adhesive 734. The base 730 is folded such that the engaging elements 733 in the first region 701 (referenced in Fig. 3) mechanically engage the engaging elements 733 in the second region 702 (referenced in Fig. 3) to maintain the mechanical fastener device 720 in a folded state until manually unfolded to expose the engaging  
25 elements 733. Preferably, the mechanical fastener device 720 further has a tab portion 710 which is formed by an extended portion of the outer member 736 as shown in Fig. 2.

In the embodiment shown in Fig. 2, the mechanical fastener device 720 is used in a disposable article 100, for example, a disposable absorbent article (Fig. 2 shows only a part of such disposable article 100 as well as the other Figs.). The mechanical fastener device 720 is joined to a part of the disposable article 100 through the adhesive 734.

Fig. 3 is a cross-sectional view of the unfolded structure of the mechanical fastener device 720 shown in Fig. 2. Referring to Fig. 3, the base 730 has the first surface 728 and the second surface 729 opposing the first surface 728. The  
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securing means 731 is provided on the first surface 728 of the base 730. The adhesive 734 is provided on the second surface 729 of the base 730. The securing means 731 includes the plurality of engaging elements 733 which are mechanically engageable with a loop fastening material (not shown in Figs.).

5        The base 730 has a first region 701 and a second region 702. Each of the first and second regions 701 and 702 has the engaging elements 733 extended from the first surface 728 of the base 730. The base 730 can be folded along a predetermined folding line (not shown in Figs.) such that the first and second regions 701 and 702 face one another as shown in Fig. 2. The engaging elements 10      733 in the first region 701 mechanically engage with the engaging elements 733 in the second region 701 to maintain the mechanical fastener device 720 in a folded state until manually unfolded to expose the engaging elements 733 of the first and second regions 701 and 702.

In a preferred embodiment, the first and second regions 701 and 702 are adjacent each other as shown in Fig. 3. Alternatively, the first and second regions 701 and 702 can be spaced apart from each other by inserting an additional region which does not contribute to the engagement of the engaging elements 733 between the first and second regions 701 and 702.

The engaging elements 733 may take any configuration as are known by one skilled in the art so long as they are able to engage each other and a loop fastening material. In a preferred embodiment, engagement of the engaging elements 733 with one another is less secure (i.e., less resistance to being pulled apart) than engagement of engaging elements 733 with a loop fastening material. Alternatively, the engagement of the engaging elements 733 with one another may 20      be more secure (i.e., more resistance to being pulled apart) than the engagement of engaging elements 733 with a loop fastening material. Each of the engaging elements 733 preferably includes a stem 742 supported at one end on the first surface 728 of the base 730 and a head 744 positioned at the other end of the stem 742. The head 744 can take any shape as are known in the art. In a 25      preferred embodiment, the head 744 has an enlarged shape as shown in Fig. 3.

The engaging elements 733 may be manufactured from a wide range of materials. Suitable materials include nylon, polyester, polyethylene, polypropylene, or any combination of these materials. Preferred materials which include the engaging elements 733 are disclosed in, for example, U.S. Patent 4,894,060

entitled "Disposable Diaper With Improved Hook Fastener Portion" issued to Nestegard on January 16, 1990.

The base 730 may be manufactured from a wide range of materials. Suitable materials include nylon, polyester, polyethylene, polypropylene, or any combination of these materials. Preferably, the base 730 is in the form of a thin plastic film of one of these materials. A preferred combined material for the base 730 and the engaging elements 733 is available from The Minnesota Mining and Manufacturing Company, St. Paul, Minn., under Code No. CS-200.

In a preferred embodiment wherein this mechanical fastener device 720 is used in a disposable article, the base 730 is joined to a part of the disposable article 100 through the adhesive 734. The adhesive 734 may be any adhesive known to those skilled in the art which provide an adequate bond with the disposable absorbent article. Preferably, the adhesive 734 is a pressure-sensitive adhesive well-known to those of ordinary skill in the adhesive art.

The outer member 736 may be manufactured from a wide range of materials. Suitable materials include nylon, polyester, polyethylene, polypropylene, or any combination of these materials. Preferred material for the outer member 736 is in the form of a thin film or a nonwoven of these materials. A suitable combined material for the outer member 736 is available from The Minnesota Mining and Manufacturing Company, St. Paul, Minn., under Code No. KJ-5173L.

In a preferred embodiment, the outer member 736 is extended from the second region 702 to the third region 703 thereby forming a tab portion 710.

Fig. 4 is a cross-sectional view of another preferred embodiment of the mechanical fastener device. In this embodiment, the mechanical fastener device 722 is used in a disposable article 100 (e.g., a disposable absorbent article). The mechanical fastener device 722 is joined to a part of the disposable article 100 through the adhesive 734. The disposable article includes a loop fastening material 101 on a part of the article 100. The mechanical fastener device 722 has the base 730 joined to the loop fastening material 101 of the disposable absorbent article 100 through the adhesive 734. The mechanical fastener device 722 includes a base 730; a securing means 731 which includes a plurality of engaging elements 733; and an adhesive 734. The engaging elements 733 extend from the base 730. The base 730 is folded such that the engaging elements 733 in the first and second regions 701 and 702 (not referenced in Fig. 4) mechanically engage

one another to maintain the mechanical fastener device 722 in a folded state until manually unfolded to expose the engaging elements 733.

In the embodiment shown in Fig. 4, the base 730 further has the third region 703 which extends from the second region 702 (not shown in Fig. 702). In the third 5 region 703, at least a part of the engaging elements 733 provided therein engages with the loop fastening material 101 of the disposable article 100 until the mechanical fastener device 722 is manually unfolded to expose the engaging elements 733 in the first and second regions 701 and 702 for use. In a preferred embodiment, the third region 703 has a portion which does not have engaging 10 elements 733 thereby forming the tab portion 710 as shown in Fig. 4.

Fig. 5 is a cross-sectional view of yet another preferred embodiment of a mechanical fastener device 724. In this embodiment, the mechanical fastener device 724 is used in a disposable article 100 (e.g., a disposable absorbent article). The mechanical fastener device 724 is joined to a part of the disposable article 100 15 through the adhesive 786. The mechanical fastener device 724 includes a base 730 having a first surface 728 and a second surface 729 opposing the first surface 728, and a securing means 731 having engaging elements 733 extended from the first surface 728 of the base 730. The mechanical fastener device 724 further includes an outer cover member 782 having a first surface 781 and a second 20 surface 783 opposing the first surface 781, and an adhesive 784 provided on the first surface 781 of the outer cover member 782. The second surface 729 of the base 730 is joined to the outer cover member 782 by the adhesive 784.

The outer cover member 782 may be manufactured from a wide range of materials. Suitable materials include nylon, polyester, polyethylene, polypropylene, 25 or any combination of these materials. Preferred material for the outer cover means 782 is a strip of a thin film or a nonwoven. In a preferred embodiment, the outer cover means 782 is a plastic film strip. In another preferred embodiment, the outer cover means 582 is a nonwoven strip.

Preferably, the adhesive 784 is a layer of adhesive for joining at least a part 30 of, more preferably, all of the second surface 729 of the base 730 to the outer cover member 782. Thus, the adhesive 784 is any of those adhesives which provide an adequate bond with the base 730 and the outer cover member 782, and preferably is any of pressure-sensitive adhesive well-known to those of ordinary skill in the adhesive art.

In the embodiment shown in Fig. 5, the outer cover member 782 is extended over the base 730 and adhesively joined to the disposable article 100 through the adhesive 784 until the mechanical fastener device 724 is manually unfolded to expose the engaging elements 733 for use. The extended portion of the outer cover member 782 forms the tab portion 710 in this embodiment.

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#### B. Method for Making Mechanical Fastener Device

Fig. 6 is a simplified plan view of a manufacturing process for the mechanical fastener device 720 shown in Fig. 2. Each of Figs. 7 to 10 is a cross-sectional view of the first continuous member 750 and/or the second continuous member 760 taken along the respective lines 7-7 to 10-10 of Fig. 6. The mechanical fastener device 720 according to the present invention can be manufactured by the following steps.

In Step 711 of Fig. 6, a first continuous member 750 which has a first side edge portion 751 and a second side edge portion 752 opposing the first side edge portion 751 is provided. Referring to Fig. 7, the first continuous member 750 includes (a) a base layer 1730 having a first surface 1728 and a second surface 1729 opposing the first surface 1728, (b) a securing means layer 1731 provided on the first surface 1728 of the base layer 1730, and (c) an adhesive layer 1734 provided on the second surface 1729 of the base layer 1730. In a preferred embodiment, the first continuous member 750 is formed by a uniform member which includes the base layer 1730, the securing means layer 1731 provided on the first surface 1728 of the base layer 1730, and the adhesive layer 1734 provided on the second surface 1729 of the base layer 1730. Herein, "uniform member" means a member being formed by, at any location through the member, a substantially same structure employing substantially identical component materials.

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A second continuous member 760 which has a first side edge portion 761 and a second side edge portion 762 opposing the first side edge portion 761 is also provided in Step 711. Referring to Fig. 8, the second continuous member 760 includes an outer member layer 1736 having a first surface 1737 and a second surface 1738 opposing the first surface 1737. In a preferred embodiment, the second continuous member 760 is formed by a uniform member which is formed by a single layer of the outer member layer 1736.

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In Step 712, the first and second continuous members 750 and 760 are juxtaposed and joined together through the adhesive layer 1734 such that the side edge portion 761 of the second continuous member 760 is projected compared

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with the side edge portion 751 of the first continuous member 750, while the side edge portion 752 of the first continuous member 750 is projected compared with the side edge portion 762 of the first continuous member 760, as shown in Fig. 9.

In Step 713, the first and second continuous members 750 and 760 are 5 folded along a predetermined folding line (not shown in Figs.) such that the engaging elements 1733 in the first region mechanically engage with the engaging elements 1733 in the second region to maintain the first and second continuous members 750 and 760 in a folded state as shown in Fig. 10.

In Step 714, the resulting continuous member which is comprised of the first 10 and second continuous members 750 and 760 is cut at a predetermined length by a cutting means (not shown in Figs.) which is well known in the art, thereby producing an individual mechanical fastener device 720.

In a preferred embodiment wherein the mechanical fastener device 720 is used for a disposable garment, the mechanical fastener device 720 is joined to a 15 part of the disposable garment (e.g., the outer-facing surface of a backsheet) through the adhesive layer 1734 after Step 714 (not shown in Figs.).

#### C. Application of Mechanical fastener device to Disposable Article

The mechanical fastener device of the present invention can be applied to a variety of garments (disposable or re-useable) in need of a mechanical fastener. 20 Preferred disposable articles include sweat bands, bandages, body wraps, disposable diapers (adult and baby), and disposable absorbent pads including sanitary napkins. In a preferred embodiment, the disposable article is a disposable garment which includes a liquid impervious backsheet, and the mechanical fastener device is joined to a part of the backsheet.

25 In a preferred embodiment, the mechanical fastener device 720 (shown in Fig. 2, for example) is used in a disposable pull-on garment (e.g., a pull-on diaper) as a disposal device. After a disposable pull-on garment is soiled by excreta, it is folded to contain the contents within the soiled pull-on garment. The folded garment is secured by the mechanical fastener device to prevent the contents in 30 the soiled pull-on garment from leaking out from the soiled pull-on garment.

The disposable pull-on garment has a front region, a back region and a crotch region between the front region and the back region. The disposable pull-on garment includes a chassis provided in the front, back and crotch regions. The chassis includes a liquid pervious topsheet, a liquid impervious backsheet 35 associated with the topsheet, and an absorbent core disposed between the

topsheet and the backsheet. The disposable pull-on garment further includes at least one pair of ear panels extending laterally outwardly from the chassis in the front or back region. The ear panels are joined to the chassis to form two leg openings and a waist opening. The disposable pull-on garment further includes the

5 mechanical fastener device of the present invention joined to the backsheet. The mechanical fastener device can be joined to any place in the backsheet as long as the disposable pull-on garment can be secured by the mechanical fastener device in a configuration that provides a convenient disposal after the disposable pull-on garment has been soiled. Preferably, the mechanical fastener device is joined to

10 the backsheet in the crotch region. Examples of suitable locations for joining the mechanical fastener device of the present invention are disclosed, for example, in WO 98/18421 (Schmitz et al.) published on May 7, 1998 and Japanese Laid-open Patent Publication No. H8-117278 (Tabata) published on May 14, 1996, wherein one would substitute the fastener disclosed therein with the mechanical fastener

15 device of the present invention.

In one embodiment, the mechanical fastener device 720 (shown in Fig. 2, for example) is used for a waist fastening system in a disposable garment (e.g., a tape type diaper). In this embodiment, the mechanical fastener device is used for the fastening between a front and back ear panels (or side panels) of the

20 disposable garment.

The disposable garment has a front region, a back region and a crotch region between the front region and the back region. The disposable garment includes a chassis provided in the front, back and crotch regions. The chassis includes a liquid pervious topsheet, a liquid impervious backsheet associated with the topsheet, and an absorbent core disposed between the topsheet and the backsheet. The disposable garment further includes at least one pair of ear panels extending laterally outwardly from the chassis in the front or back region. The ear panels are joined to the chassis. The disposable garment further includes the mechanical fastener devices of the present invention each joined to the respective

25 ear panel. The mechanical fastener device can be joined to any place in the ear panel as long as the disposable garment can be secured by the mechanical fastener device around the waist of the wearer. Preferably, the mechanical fastener device is provided adjacent to the longitudinal edge portion of the ear panel. Examples of suitable locations for joining the mechanical fastener device of

30 the present invention are disclosed, for example, in U.S. Patent No. 4,963,140

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issued to Robertson et al. on October 16, 1990 and U.S. Patent No. 5,019,065 issued to Scripps on May 28, 1991, wherein one would substitute the fastener disclosed therein with the mechanical fastening device of the present invention.

5 In an alternative embodiment, the mechanical fastener device can be provided on the backsheet in the front region as a part of a fastener system. In this embodiment, the disposable garment can be secured around the waist of the wearer by joining the ear panel to the backsheet through the mechanical fastener device. Preferably, the mechanical fastener device is provided adjacent to the waist edge of the chassis.

10 In yet another embodiment, the mechanical fastener device 720 (shown in Fig. 2, for example) is used as a fastener for securing a disposable absorbent pad (e.g., a sanitary napkin, a pantiliner and an incontinent pad) to the crotch of a wearer's undergarment. In this embodiment, the mechanical fastener device is provided on the outer surface of a backsheet.

15 The disposable absorbent pad includes a liquid pervious topsheet, a liquid impervious backsheet associated with the topsheet, and an absorbent core disposed between the topsheet and the backsheet. The mechanical fastener device can be joined to any place in the absorbent pad as long as the disposable absorbent pad can be secured by the mechanical fastener device to the crotch of a 20 wearer's undergarment. Examples of suitable locations for joining the mechanical fastener device of the present invention are disclosed, for example, in U.S. Patent No. 5,300,058 issued to Goulait et al. on April 5, 1994, wherein one would substitute the fastener disclosed therein with the mechanical fastening device of the present invention.

25 It is understood that the examples and embodiments described herein are for illustrative purpose only and that various modifications or changes will be suggested to one skilled in the art without departing from the scope of the present invention.

**WHAT IS CLAIMED IS:**

1. A mechanical fastener device comprising:  
a base having a first surface and a second surface opposing the first surface, the first and second surfaces having a first region and a second region; and  
5 a plurality of engaging elements extending from the first surface of the base in the first and second regions, the engaging elements being mechanically engageable with a loop fastening material;  
wherein the base is folded such that the first region and the second region face one another, and wherein the engaging elements in the first region 10 mechanically engage with the engaging elements in the second region to maintain the mechanical fastener device in a folded state until manually unfolded to expose the engaging elements in the first and second regions, wherein the second surface of the first region is joined to an article.
2. The mechanical fastener device of Claim 1, further comprising an adhesive provided on the second surface of the first region, wherein the second surface of the first region is secured to the garment by the adhesive.
3. The mechanical fastener device of Claim 1, further comprising a tab portion extending from the second region of the base, wherein the tab portion does not overlay the first region of the base when the base is folded.
4. The mechanical fastener device of Claim 3, wherein the tab portion includes a securing means for securing the tab portion to the garment.
5. The mechanical fastener device of Claim 1, wherein the article is a disposable garment which includes a liquid impervious backsheet, and wherein the mechanical fastener device is joined to a part of the backsheet.
6. The mechanical fastener device of Claim 5, wherein the disposable garment is a diaper, an incontinent pad, a sanitary napkin, or a pantiliner.

7. The mechanical fastener device of Claim 1, wherein the article is a disposable garment which includes a waist fastener system employing the mechanical fastener device of Claim 1.

8. The mechanical fastener device of Claim 7, wherein the disposable garment is a diaper.

9. A disposable article comprising the mechanical fastener device of Claim 1, wherein:

- (a) the disposable article has a nonwoven region,
- (b) the second surface of the base is joined to a part of the nonwoven region,
- 5 (c) the mechanical fastener device further has a tab portion extending from the second region, wherein the tab portion does not overlay the first region when the base is folded, and wherein the tab portion has a plurality of engaging elements extending therefrom, and
- (d) the engaging elements in the tab portion mechanically engage with a part
- 10 of the nonwoven region when the base is folded.

10. A method for making a mechanical fastener device, comprising the steps of: providing a first continuous member having two side edge portions, the first continuous member including (a) a base layer having a first surface and a second surface opposing the first surface, the first surface having a first region and a second region, (b) a plurality of engaging elements extending from the first surface of the base layer, and (c) an adhesive layer provided on the second surface of the base layer;

providing a second continuous member having a folding line and two side edge portions, and including an outer member layer;

10 juxtaposing and joining the first and second continuous members together through the adhesive layer such that one of the two side edge portions of the first continuous member is projected compared with the corresponding one side edge portion of the second continuous member;

15 folding the joined first and second continuous members along the folding line such that the engaging elements in the first region mechanically engage with the engaging elements in the second region to maintain the first and second continuous members in a folded state; and

cutting the folded first and second continuous members at a predetermined length to provide a discrete mechanical fastener device.

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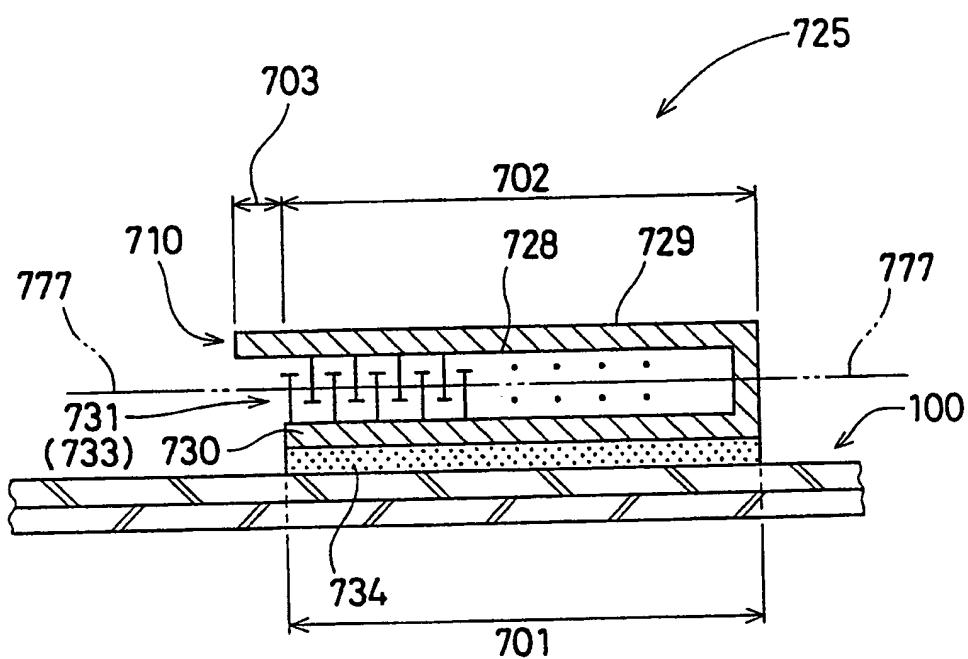


Fig. 1

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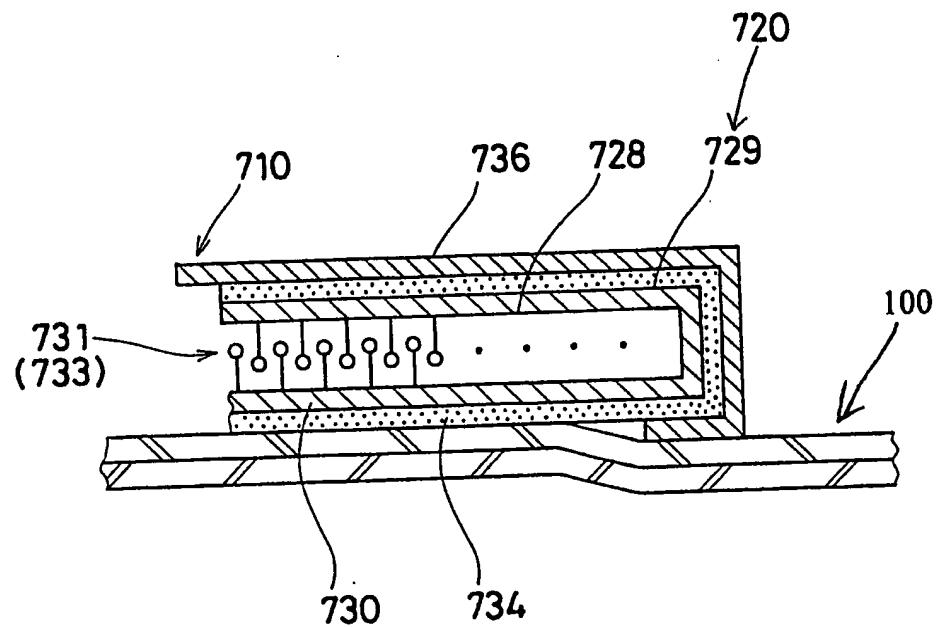


FIG. 2

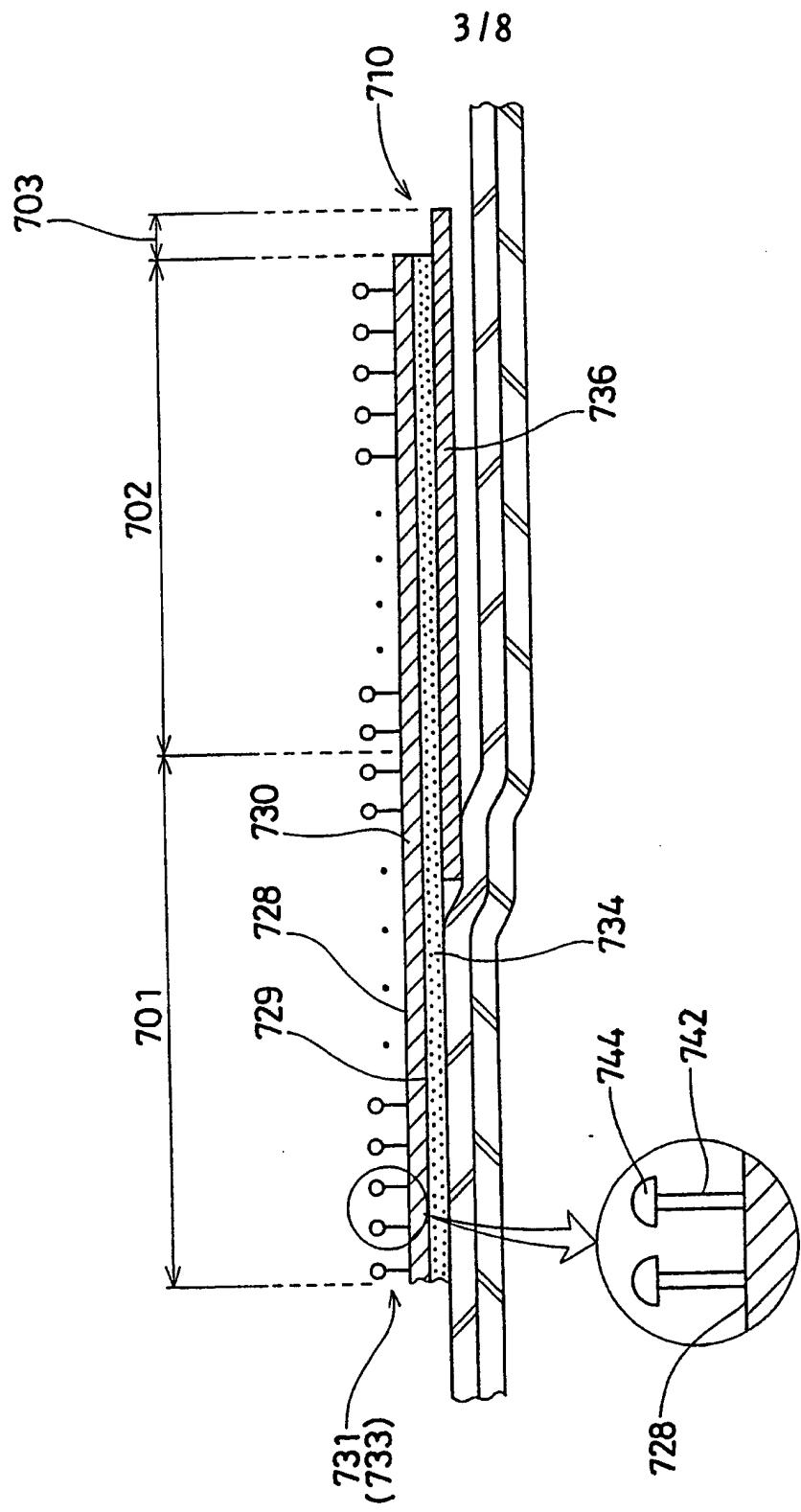


FIG.3

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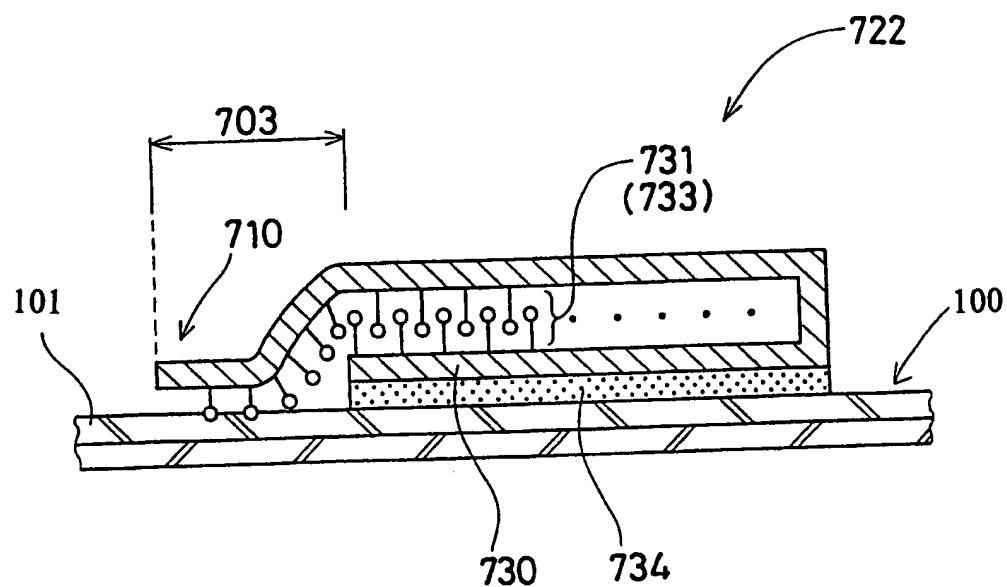


FIG.4

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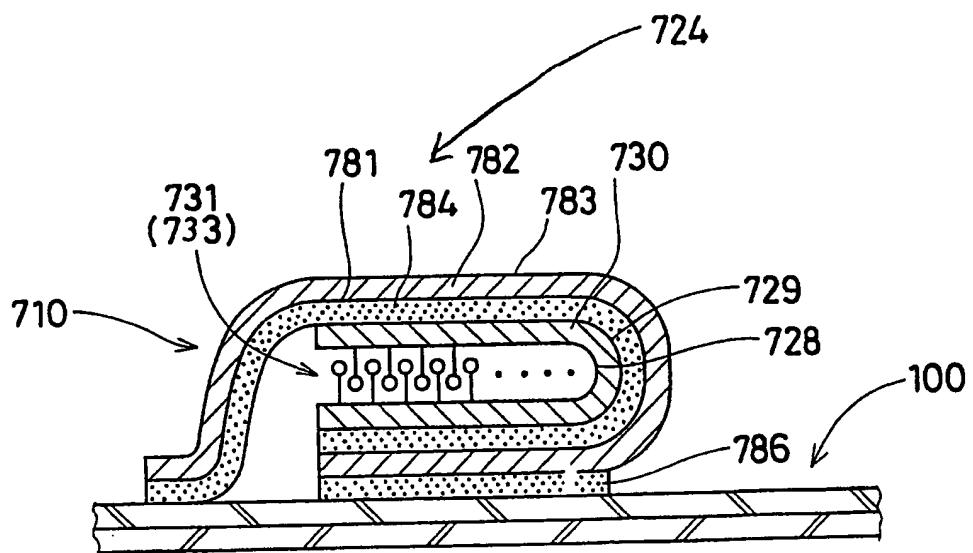


FIG. 5

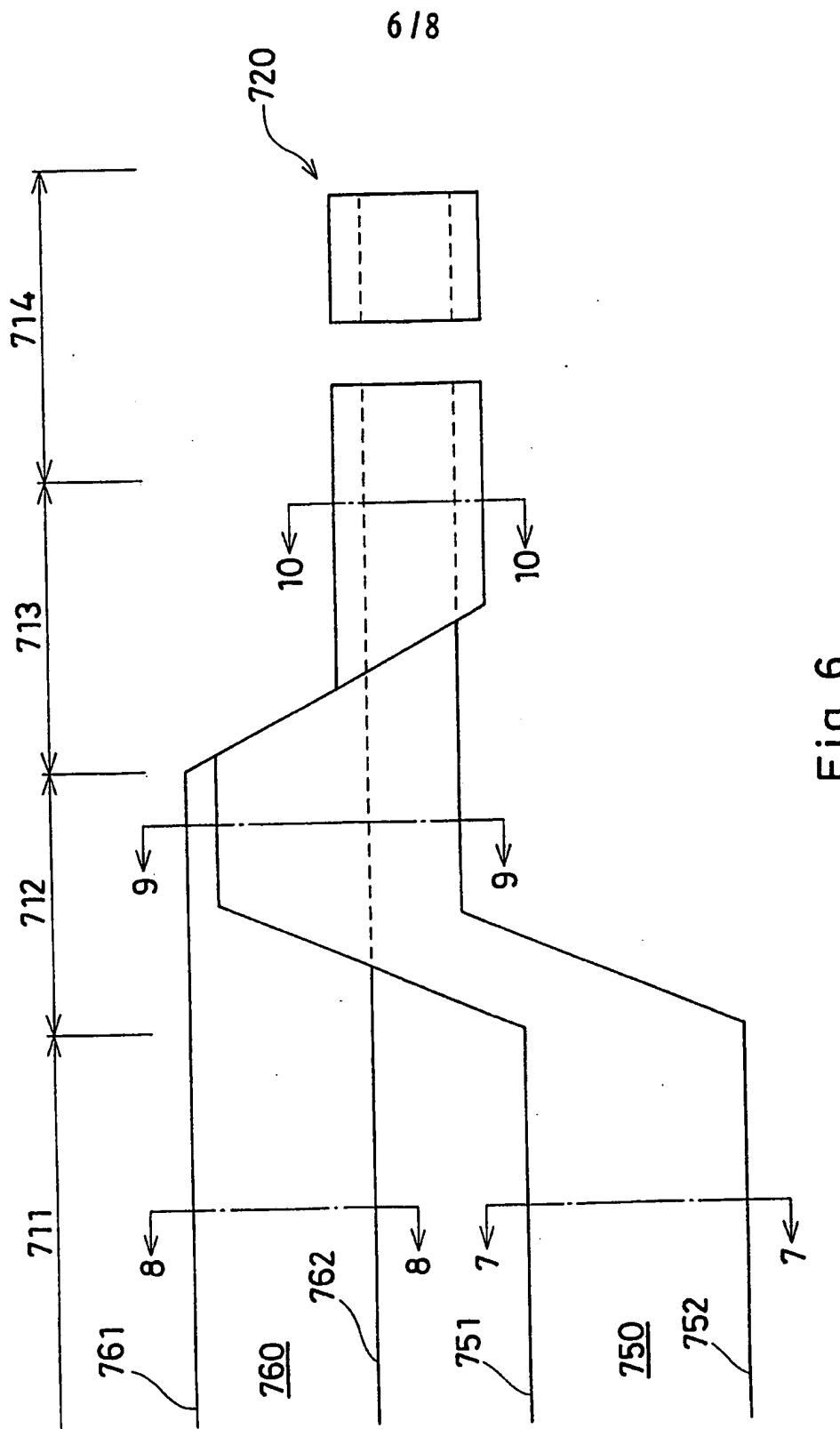


Fig. 6

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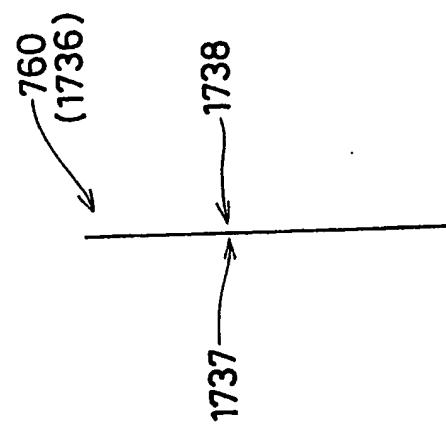


Fig. 8

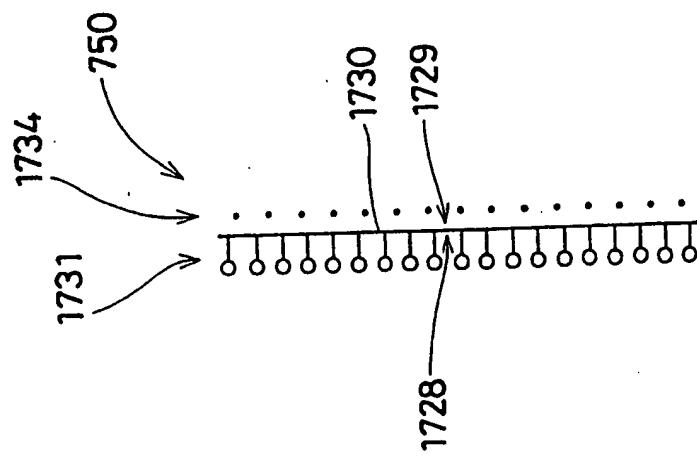


Fig. 7

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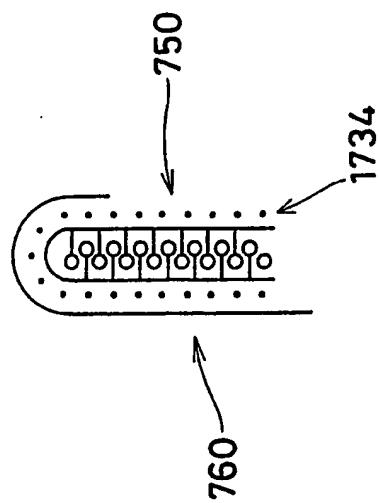


Fig. 10

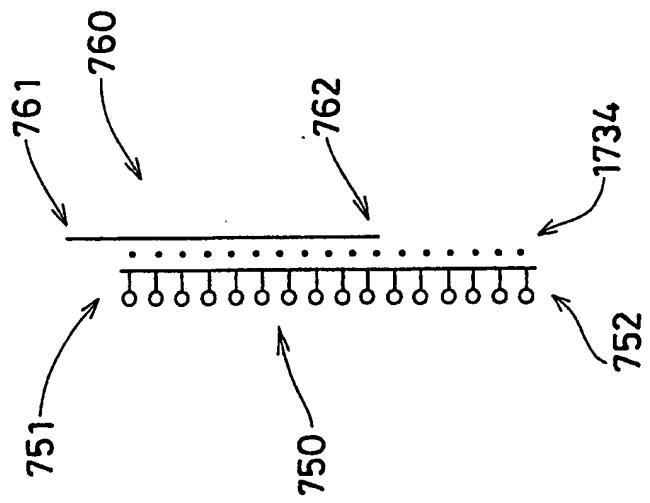


Fig. 9

# INTERNATIONAL SEARCH REPORT

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|---|
| International Application No<br>PCT/US 98/23886 |
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| A. CLASSIFICATION OF SUBJECT MATTER<br>IPC 6 A44B18/00 A61F13/58 |
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|---|
| According to International Patent Classification (IPC) or to both national classification and IPC |
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| <b>B. FIELDS SEARCHED</b> |
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| Minimum documentation searched (classification system followed by classification symbols)<br>IPC 6 A44B A61F |
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|---|
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched |
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| Electronic data base consulted during the international search (name of data base and, where practical, search terms used) |
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| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b> |
|---|

| Category | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|----------|--|-----------------------|
| X        | US 5 537 722 A (NIEDERHOFER LAURA S ET AL) 23 July 1996<br>cited in the application<br>see column 3, line 1-45<br>see column 4, line 7-43<br>see column 5, line 33 - column 6, line 42<br>see figures<br>--- | 1-10                  |
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| A        | EP 0 756 855 A (UNI CHARM CORP)<br>5 February 1997<br>see the whole document<br>---  | 1-10<br>-/-           |

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

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"&" document member of the same patent family

|   |  |
|---|--|
| Date of the actual completion of the international search | Date of mailing of the international search report |
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| 21 May 1999 | 21/06/1999 |
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| Name and mailing address of the ISA<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Authorized officer |
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| Kock, S |
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## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 98/23886

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|----------|---|-----------------------|
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| A        | US 5 019 065 A (SCRIPPS CHARLES L)<br>28 May 1991<br>cited in the application<br>see abstract; figures<br>-----             | 1-10                  |

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/US 98/23886

| Patent document cited in search report |   | Publication date | Patent family member(s)   |  | Publication date   |
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